



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

see Fig. 7, which was drawn by the aid of the camera, and shows all that was defined in their proper relations. I should designate the parts figured as follows: *a*, beginning of the arm; *j*, the first pair of footjaws; *i*, second pair of antennæ; *α*, antennæ; *ι*, styliform appendage, or second antennæ; *n*, oral opening; *m*, mandibles; *s*, maxillæ.

The male of this species I have seen, but owing to misfortune was unable to sketch it, so I omit further reference to it, except to say that the one seen was detached, and although I have taken microscope and compressor with me "a fishing" and examined numerous females at once as taken, I was not successful in securing another; either his minuteness has been overlooked as attached, or he is free at will, fleeing danger that his partner must face.

ON THE GROWTH OF THE FIRST BRANCHIAL CLEFT.

BY LUCIEN HOWE, M. D.

Nearly every detail concerning the Eustachian tube has been so carefully studied by Rudinger, Urbantschitsch and others, that there would seem to be little opportunity for new observations concerning it. There is, however, one question which apparently remains unsettled, for when the student would learn as to the development and growth of this portion he finds the literature of the subject only fragmentary, and the statements concerning it often contradictory. The great impetus, however, which has been given to the study of embryology by Kölliker, Haeckel, and their collaborator, has caused the development of separate organs to be examined more in detail, and among the others the ear has not been neglected.

In order to make the description as clear as possible, it is advisable to recall for a moment a few familiar facts of development and mention the views of the older authorities concerning them. It will be remembered that at an early stage of foetal life there are formed near the lower part of the cephalic mass several horizontal slits, called the branchial fissures or gill openings. These range in number from three to six, being the most numerous in the lower vertebrates. The buds or processes included between them are known as the gill arches. As the embryo grows, the superior pairs of these arches increase in size, and uniting in the median line assist in forming the lower jaw. Meanwhile, also, the first or superior gill opening is encroached upon by the new tissue, gradually becoming smaller and smaller. The question as to whether or not this fissure becomes entirely closed will form the main feature of the present remarks. Several authorities incline to the opinion that the persistence of a portion of this fissure constitutes the Eustachian tube, while other observations make it appear that the opening becomes entirely obliterated, and the tube is formed subsequently by a diverticulum from the pharynx which extends outwards until it reaches the external ear. For it is now generally conceded that the external ear is formed from an involution of the tegumentary covering which becomes apparent at a very early stage of foetal life.

As long ago as 1827 Huschke announced in substance that the Eustachian tube was formed by the approximation but non-union of the sides of the first branchial cleft. In Kölliker's *Entwicklungsgeschichte* the reader is left to infer that the tube is formed from a part of the cleft, although the two different statements are not entirely consistent. On the other hand several observers have asserted that the tube is formed in a manner entirely independent of the first branchial fissure. Von Baer gave the weight of his authority to this opinion, and although it was proved that he was in error in regard to the development of the middle ear, his observations concerning the formation of the Eustachian tube are the most accurate. This side of the question, with important modifications, has also been presented very forcibly by Dr. Hunt in the *American Journal of Medical Sciences* for January, 1877.

After calling attention to the general confusion of our knowledge upon the subject, he describes the appearances in a series of ten embryos, representing as many stages of development, and concludes as to the Eustachian tube that it is formed by an extension outwards of a depression or pocket in the pharyngeal wall. At first glance it would seem that such views are diametrically opposite to those first mentioned. They prove at least the difficult nature of the subject and the degree to which such appearances are apt to mislead. An examination of certain sections of fetal heads has induced me to think, however, that these opposing views might be reconciled, and it seems worth while, if possible, to lessen the confusion which exists concerning the subject. During the last year I have been engaged in making similar sections of the head of the human fetus and of rabbits, and after preparing a large number of specimens have come to the conclusion that the first branchial fissures do close at one portion, for a time, and the diverticulum from the pharynx just mentioned is an appearance produced by the remaining part of the walls being approximated but still separate. This conclusion is based principally, as I stated, upon an examination of sections of the head at an early stage of development. The cuts can be studied to best advantage if made near the plane of the fissure, and so as to pass through the otic vesicle. Most of those in the series mentioned were obtained in this manner, but some were on a plane directed antero-posteriorly, and almost at right angles to the fissure. In an embryo of 56 millimeters in length the appearance presented is not unlike that figured by Kölliker, when describing a chicken at the tenth day of fetal existence. In another of 78 millimeters in length the sides of the first branchial fissure have not only closed, but in doing so have apparently left a spot or opening between them at one point, and the pharyngeal wall in that vicinity is bent outwards, as it were, into a kind of diverticulum towards the otic vesicle.

In a still later stage this vesicle has not only been pushed inward, but, by the formation of new tissue about the apparent pocket from the pharynx, its length is increased, until finally the middle ear appears at its extremity. It will be readily inferred that the opening which persists on the site at the otherwise closed branchial fissures, and at which point the middle ear afterwards appears, is in fact the rudiment of that cavity. I consider this to be the case, although the diversity of opinion already existing among the most eminent histologists now living, and the great difficulties of the subject tend to make one cautious as regards positive statements.